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FETZNER, TIFFANY A	

ART UNIT	PAPER NUMBER
2859	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/757,051	SCHOEN ET AL.	
	Examiner	Art Unit	
	Tiffany A Fetzner	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 August 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *05/17/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

A) **Figure 1** does not show component 12 which is taught on page 11 at line 7.. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because

A) Reference character "26" has been used to designate both a "resistivity array" [See page 11 line 22] and "an imaging assembly" [See page 12 lines 4-5].

B) Reference character "32" has been used to designate both a "circumferential acoustic televiewer" [See page 12 line 1] and "an imaging assembly" [See page 12 lines 4-5]. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

A) Components "125" and "137" shown in Figure 4B are not referred to in applicant's disclosure. [See page 21 line 14 through page 23 line 21] The examiner recommends on page 21 line 15, **inserting** "125" after the word "determination".

B) Curve "301" shown in Figure 7A is not referred to in applicant's disclosure. [See page 35 line 21 through page 36 line 2]. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

5. The abstract of the disclosure is objected to because it is to long. The current rules which became effective in March 2001 require that the abstract be no longer than

15 lines of double spaced text, or 150 words. Applicant's abstract is 19 lines long. A new, shorter abstract, on a separate sheet of paper is needed. See MPEP ' 608.01(b).

6. The disclosure is objected to because of the following informalities:

A) On page 11, line 19 in paragraph [0019] **delete** "Figure 2" and **insert** "Figure 2A".

B) On page 16 in line 12 paragraph [0028] the wrong figure is referred to **delete** "Figure 1", and **insert** "Figure 2A".

C) On page 17, line 1 in paragraph [0030] **delete** "Figure 4", and **insert** "Figure 4A" .

D) On page 19, line 11 in paragraph [0034] the wrong step is referred to **delete** "111", and **insert** "109" .

E) On page 12, line 18 in paragraph [0020] **insert** "caliper" after "extendable" to ensure proper antecedent basis. All adjectives that describe a component need to be present the first time a component part is referred to. Appropriate correction is required.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

8. **A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c)** may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

9. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. **Claims 1-20 are rejected** under the judicially created doctrine of non-statutory obvious double patenting over **claims 1-20** of **Schoen et al.,** U. S. Patent No. **6,686,736 B2** since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

11. The subject matter claimed in the instant application is fully disclosed in the issued US patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

12. **Claims 1-20** of **Schoen et al.,** U. S. Patent No. **6,686,736 B2,** and **Claims 1-20** of the instant **Schoen et al.,** application are substantially equivalent and substantially correspond to one another, although the sequence of steps in the instant application is slightly more broad than the allowed **Schoen et al.,** U. S. Patent No. **6,686,736 B2.** The examiner notes that the broadening of the scope, makes the prior art of record listed below applicable to applicant's claims.

13. To overcome this non-statutory obvious double patenting rejection, applicant may file a terminal disclaimer. The filing of a terminal disclaimer however, **will not overcome** the applied prior art below.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. **Claims 1-3, 7, 8, and 10-20** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Freedman et al.,** US patent 6,032,101 issued February 29th 2000; in view of the article "The Petrophysics of Electrically Anisotropic Reservoirs; by J.D.

Klein, P.R. Martin, and D.F. Alen; from The Log Analyst, May-June 1997, pages 25-36. [Hereafter **Klein et al.**,]

17. With respect to **Claim 1**, **Freedman et al.**, teaches and suggests "A method of petrophysical evaluation of a formation comprising: (a) using values of resistivities of the formation and deriving therefrom an estimate of water content thereof" [See abstract, col. 7 line 4 through col. 8 line 20; where the water saturation Sxo, and Sw the fraction of the pore volume occupied by formation water is calculated from equations 5 and 6 "using values of resistivities of the formation". The equations approximate the saturation exponent, therefore the results obtained are interpreted by the examiner to suggest "an estimate of water content". **Freedman et al.**, also teaches and suggests that there is always an amount of uncertainty in determining resistivities, [See col. 16 line 7 through col. 17 line 27] this suggests that the effect of each type of resistivity should be considered in evaluating and estimating the water content of a formation. The examiner notes that an estimate of the water saturation of a formation, is an estimate of the water content of the formation.]

18. Additionally, **Freedman et al.**, teaches and suggests step "(b) using NMR measurements of the formation and deriving therefrom an estimate of bulk irreducible water content of the formation;" [See col. 14 line 61 through col. 16 line 6, Figure 2, Table 1, the abstract and col. 1 lines 14-20. The examiner notes that bound fluid volume or BFV is a conventional term in the NMR art, that represents the "bulk irreducible water content" of a formation, therefore the examiner is interpreting BFV as an indication of "bulk irreducible water content" taught by the **Freedman et al.**, reference. **Freedman et al.**, also teaches and suggests step "(c) comparing the estimate of water content with the estimate of bulk irreducible water content of the formation;" [See Figure 2 col. 7 line 53 through col. 13 line 12. The flow chart of Figure 2 suggests this step.] The limitation of step "(d) obtaining a parameter of interest of the formation", is taught throughout the entire **Freedman et al.**, reference, because numerous parameters are obtained, from figure 2. [See Figure 2 and the entire reference in general].

19. The **Freedman et al.**, reference lacks directly teaching that a values for "horizontal and vertical resistivities" of the formation are used to derive an estimate of

water content in the formation, however **Klein et al.**, teaches that parallel, or longitudinal resistivity is measured parallel to the bedding of a formation, while perpendicular or transverse resistivity is measured perpendicular to the bedding of a formation. [See page 25 col. 2 paragraph 4]. The examiner considers "vertical" resistivity as an equivalent term for "parallel, or longitudinal resistivity" and "horizontal" resistivity as an equivalent term for "perpendicular or transverse resistivity". **Klein et al.**, teaches determining perpendicular and parallel ("horizontal and vertical") values in terms of water saturation, and it would have been obvious to one of ordinary skill in the art, at the time that the invention was made that the water saturation equations 4, 5, and 6 can be also be expressed in terms of resistivity, and subsequently solved to express water saturation, [See **Klein et al.**, page 26 equations 4, 5, and 6] because it is well known that a mathematical equation solved for one parameter, can also be written in a form which solves for the other parameters of the same equation.

20. It would have been obvious to one of ordinary skill in the art, at the time that the invention was made, that the teachings of **Klein et al.**, can be used in combination with the teachings of **Freedman et al.**, because **Freedman et al.**, teaches the desirability of analyzing any uncertainty factors that affect the resistivity parameters, in determining formation parameters [See **Freedman et al.**, col. 16 lines 29-65] and **Klein et al.**, teaches that in order to make accurate estimates of water saturation, the dependence of anisotropy on fluid saturation should be considered, and in analyzing anisotropy both parallel and perpendicular measurements are needed. [See **Klein et al.**, page 25 col. 2 and the entire reference in general.] Therefore, the substitution of **Klein et al.**,'s resistivities for the resistivities of **Freedman et al.**, would have been obvious, because **Freedman et al.**, teaches using resistivity measurements that are as accurately determined as possible.

21. With respect to **Claim 2**, **Freedman et al.**, teaches and suggests step (l) "inverting said values of resistivities of the formation using a tensor petrophysical model to give a first estimate of fractional volume of laminated shale in the formation;" because **Freedman et al.**, teaches that electrical conductivity is the reciprocal (i.e. the inversion) of conductivity [See col. 7 lines 6-9] and in **Freedman et al.**, conductivity the inversion

of resistivity is used, with the Waxman-Smits Model to give a first estimate of fractional volume of shale. [See col. 5 lines 1-32, col. 10 line 45 through col. 11 line 20, col. 16 lines 29-65 where estimates are obtained for a formation that contains both shale and sand layers, or laminae.] The examiner notes that the Waxman-Smits Model is a tensor petrophysical model.

22. **Freedman et al.**, also teaches and suggests step "(ii) obtaining measurements of density and/or neutron porosity of the formation and using a volumetric model for deriving therefrom a second estimate of fractional volume of laminated shale;" [See Figures 2, 3, and 4; col. 3 line 61-col. 4 line 26] **Freedman et al.**, suggests step "(iii) if said second estimate of fractional shale volume is greater than said first estimate of fractional shale volume, inverting said resistivities using a tensor petrophysical model including said second estimate of fractional shale volume and obtaining therefrom a bulk water content of the formation" because **Freedman et al.**, evaluates, and calculates resistivity in a number of different ways, and checks the variance of the obtained values by Waxman-Smits Model. [See col. 16 lines 29 through col. 18 line 39]

23. The **Freedman et al.**, reference lacks directly teaching that "horizontal and vertical" resistivity values as mentioned in the rejection of **claim 1,** however **Klein et al.**, teaches "horizontal and vertical resistivities" as mentioned in the reaction reasons of claim 1 which need not be reiterated. Additionally, **Klein et al.**, also teaches estimating the shale volume [See page 29] The same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 2.**

24. With respect to **Claim 3**, **Freedman et al.**, lacks directly teaching "determining a vertical and horizontal resistivity of an anisotropic sand component of the formation and determining therefrom and from at least one additional measurement selected from the group consisting of. (I) NMR measurements of the formation, and, (ii) a bulk permeability of the sand component, a parameter of interest of a coarse and a fine grain portion of the sand component." However, **Klein et al.**, teaches and suggests this limitation. [See page 25 col.2; which suggests use with coarse and fine grain sand, page 31 col. 2; page 32, page 33 page 35 which determine "a bulk permeability of the sand component"] The examiner notes that the resistivities of **Freedman et al.**, teach

the use of "NMR measurements of the formation". The **Freedman et al.**, reference lacks directly teaching that "horizontal and vertical" resistivity values as mentioned in the rejection of **claim 1,** however **Klein et al**., teaches "horizontal and vertical resistivities" as mentioned in the reaction reasons of **claim 1** which need not be reiterated. The same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 3**.

25. With respect to **Claim 7**, **Freedman et al.**, teaches and suggests "using said volumetric model further comprises using at least one of- (I) the Thomas-Stieber model, and, (ii) the Waxman-Smits model." [See col. 1 lines 37-39 col. 10 line 55 through col. 11 line 19; col. 17 lines 5-8]. The same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 7**.

26. With respect to **Claim 8**, **Freedman et al.**, lacks directly teaching "said parameter of interest is selected from the group consisting of. (A) a fractional volume of said coarse grain component, (B) a fractional volume of said fine grain component, 8 a water saturation of said coarse grain component, (D) a water saturation of said fine grain component, (E) a permeability of said coarse grain component, and, (F) a permeability of said fine grain component." However, **Klein et al.,** considers fine and coarse grains, volume, water saturation, and permeability. [See the entire **Klein et al.,** article for the specific calculations. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3** also apply to **claim 8**.

27. With respect to **Claim 10**, **Freedman et al.**, lacks directly teaching "a bulk permeability measurement of the anisotropic sand and deriving the parameter of interest further comprises: **A** obtaining a family of possible distributions of volume fractions and bulk irreducible water content (BVI) for the coarse and fine sand components; **B** determining horizontal, vertical and bulk permeability values associated with said family of possible distributions; and **C** selecting from said family of possible distributions the one distribution that has a determined bulk permeability substantially equal to the measured bulk permeability." However, the **Klein et al.,** article suggests this limitation. [See the entire **Klein et al.,** article, pages 25-36, and Figures 1-16] The

same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3** also apply to **claim 10**.

28. With respect to **Claim 11**, **Freedman et al.**, teaches and suggests that "bulk permeability is obtained from the group consisting of (1) NMR diffusion measurements, (11) a formation testing instrument, (III) a pressure buildup test, and, (IV) a pressure draw down test." [See col. 15 lines 34 through col. 16 line 50; and Figures 2, 3, 4; where the NMR properties and bulk densities of the fluids in the formation are taught to depend of fluid type, reservoir temperature, and pressure. The formation-testing tool of **Freedman et al.**, includes NMR well-logging tools, LDT's logging density tools, and shallow-resistivity tools]. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3, 10** also apply to **claim 11**.

29. With respect to **Claim 12**, **Freedman et al.**, lacks directly teaching "determining the horizontal and vertical permeability values associated with said family of distributions for the coarse and fine sand components further comprises using the Coates-Timur equation: **K'[(φ/C)^a] * [(φ-BVI)/BVI]^b** where K is a permeability, φ is a porosity, BVI is the bound volume irreducible, and a, b, and C are fitting parameters." However, the **Klein et al.,** article suggests this limitation. [See equation 7 on page 31 which is considered to be the same mathematically equivalent equation, as the equation claimed by applicant, and the entire **Klein et al.,** article, pages 25-36, and Figures 1-16 in general] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3, 10** also apply to **claim 12**.

30. With respect to **Claim 13**, **Freedman et al.**, lacks directly teaching "determining horizontal, vertical and bulk permeability values further comprises using a relationship of the form **K ' Cφ^a T^b** where **K** is a permeability, **φ** is a porosity and **T** is a NMR relaxation time, and **a, b**, and **C** are fitting parameters." However, **Freedman et al.**, teaches and suggests that the NMR method may further include "determining a permeability **K** of the formation using any known permeability model" [See col. 15 lines 34-38] Therefore applicant's claim 13 is within the scope of the teachings of the **Freedman et al.**, reference. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3, 10** also apply to **claim 13**.

31. With respect to **Claim 14**, **Freedman et al.**, lacks directly teaching that "T is a longitudinal NMR relaxation time." However, **Freedman et al.**, teaches and suggests that the NMR method may further include "determining a permeability **K** of the formation using any known permeability model" [See col. 15 lines 34-38] Therefore applicant's equation of claim 13 is within the scope of the teachings of the **Freedman et al.**, reference. Additionally since T1 is conventionally a longitudinal NMR relaxation time, and Figures 2, 3, and 4 show in blocks 211, 311, and 411 using T1 as an input for determining permeability (i.e. parameter K), applicant's equation of claim 13 with "T" as a longitudinal NMR relaxation time. is within the scope of the teachings of the **Freedman et al.**, reference. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3, 10**, **13** also apply to **claim 14**.

32. With respect to **Claim 15**, **Freedman et al.**, lacks directly teaching "the tensor petrophysical model in (I) comprises at least one of (A) an isotropic sand component, and, (B) an anisotropic sand component." **However, Klein et al.,** suggests this limitation [See pages 25 through 30 and Figure 1, both isotropy and anisotropy are taught.] The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 2** also apply to **claim 15**.

33. With respect to **Claim 16**, **Freedman et al.**, lacks directly teaching "the coarse sand portion of the selected distribution is characterized by an irreducible water saturation less than an irreducible water saturation of the fine grain sand portion of the selected distribution." However, **Klein et al.,** teaches and suggests this limitation. [See page 25 col. 2, page 26, page 27, page 33, page 34 and page 35.] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3, 10** also apply to **claim 16**.

34. With respect to **Claim 17**, **Freedman et al.**, teaches and suggests "specifying a formation factor for a constituent of the formation." [See Figures 2, 3, 4; col. 1 line 14-50; especially col. 1 line 49.] The same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 17**.

35. With respect to **Claim 18**, **Freedman et al.**, lacks directly teaching "the determined bulk permeability is a spherical permeability related to the horizontal and

vertical permeability values by a relationship of the form Ksph'[(Kh^2 Kv)^(1/3)]." However, **Freedman et al.**, teaches and suggests that the NMR method may further include "determining a permeability **K** of the formation using any known permeability model" [See col. 15 lines 34-38] Therefore applicant's claim 18 is within the scope of the teachings of the **Freedman et al.**, reference. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3, 10, 13** also apply to **claim 18**.

36. With respect to **Claim 19**, **Freedman et al.**, lacks directly teaching "specifying the parameters a, b and C" However, the **Klein et al.,** article suggests and shows this limitation. [See equation 7 on page 31 which is considered to be the same mathematically equivalent equation, as the equation claimed by applicant in claim 12, and the entire **Klein et al.,** article, pages 25-36, and Figures 1-16 in general. The examiner notes that in equation 7 of **Klein et al.,** parameter a is "2", b is "2", and c is "1".] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3, 10, 12** also apply to **claim 19**.

37. With respect to **Claim 20**, **Freedman et al.**, lacks directly teaching "specifying the parameters a, b and C" However, as mentioned in the rejection of claim 13, **Freedman et al.**, teaches and suggests that the NMR method may further include "determining a permeability **K** of the formation using any known permeability model" [See col. 15 lines 34-38] Therefore applicant's claim 13 is within the scope of the teachings of the **Freedman et al.**, reference. Additionally, because parameters a, b and C are fitting parameters, it would have been obvious to one of ordinary skill in the art, at the time that the invention was made to specify those parameters, to enable an individual of ordinary skill in the art, the ability to use the equations, and verify the reported results. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3, 10, 13** also apply to **claim 20**.

38. **Claims 4-6** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Freedman et al.,** US patent 6,032,101 issued February 29th 2000; in view of the article "The Petrophysics of Electrically Anisotropic Reservoirs; by J.D. **Klein**, P.R. Martin, and D.F .Alen; from The Log Analyst, May-June 1997, pages 25-36. [Hereafter **Klein et al.**,];

in further view of **Hagiwara** US patent 5,966,013 issued October 12th 1999; filed June 12th 1996.

39. With respect to **Claim 4**, **Freedman et al.**, lacks directly teaching "using a transverse induction logging tool for obtaining said values of horizontal and vertical resistivities of the formation". However, **Hagiwara** teaches obtaining values of horizontal and vertical resistivities with a transverse induction logging tool. [See col. 3 lines 16-20; col. 5 line 60 through col. 6 line 37 where two different logging induction tools are taught; and col. 10 lines 40-47 which teaches determining vertical and horizontal resistivities with induction measurements with an anisotropy response factor.] The teachings of **Hagiwara** can be combined with the teachings of **Freedman et al.**, because **Hagiwara** considers formation anisotropy and provides the same supportive feature of vertical and horizontal resistivities as taught by **Klein et al**. The **Klein et al.**, reference lacks teaching the types of tools used to make the resistivity measurements, and the **Hagiwara** reference is combined with **Klein et al.**, to show that the use of induction well-logging tools for this measurement is well-known. Therefore, the same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 4**.

40. With respect to **Claim 5**, **Freedman et al.**, lacks directly teaching "using an induction logging tool for obtaining said values of horizontal resistivities and a focused current logging tool for obtaining said values of vertical resistivities", however **Hagiwara** teaches and suggests this limitation. [See col. 3 lines 16-20; col. 5 line 60 through col. 6 line 37 where two different logging induction tools are taught; col. 10 lines 40-47 and the entire reference in general.] Therefore, the same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 4** also apply to **claim 5**.

41. With respect to **Claim 6**, **Freedman et al.**, teaches and suggests "the tensor petrophysical model further comprises a laminated shale component and a sand component." [See col. 16 line 29-64; col. 15 lines 17-21; col. 7 lines 23-60] This limitation is also suggested by **Klein et al.,** [See page 25 col. 2, page 26] and **Hagiwara** [See col. 1 lines 57-59] The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 4, 5** also apply to **claim 6**.

42. **Claim 9** is rejected under **35 U.S.C. 103(a)** as being unpatentable over **Freedman et al.,** US patent 6,032,101 issued February 29th 2000; in view of the article "The Petrophysics of Electrically Anisotropic Reservoirs; by J.D. **Klein**, P.R. Martin, and D.F. Alen; from The Log Analyst, May-June 1997, pages 25-36. [Hereafter **Klein et al.**,]; in further view of **Vinegar et al.,** US patent 4,719,423 issued January 12th 1988

43. With respect to **Claim 9**, **Freedman et al.**, teaches and suggests that "the at least one additional measurement comprises an NMR measurement" [See col. 1 lines 14-20; col. 4 lines 29-33; col. 4 lines 38-42; col. 4 line 55 through col. 6 line 22]. **Freedman et al.**, also teaches and suggests "deriving the parameter of interest further comprises deriving a distribution of relaxation times from said NMR measurements" [See col. 12 line 43 through col. 13 line 32, Figures 2, 3, and 4; col. 14 line 61 through col. 17 line 7]. **Freedman et al.**, lacks directly teaching "obtaining a distribution of components of said anisotropic sand." However, **Klein et al.,** teaches "obtaining a distribution of components of said anisotropic sand" [See the entire **Klein et al.,** article.] Additionally, **Vinegar et al.**, teaches specifically "using NMR distributions to determine the anisotropic component or a porous formation specimen" and the examiner notes that sand is a porous formation specimen. [See col. 7 lines 1-44; col. 4 line 54 through col. 6 line 15] The teachings of **Freedman et al.**, can be modified to include the teachings of **Vinegar et al.**, because **Vinegar et al.**, teaches horizontal and vertical resistivities, and the importance of anisotropy in conducting an NMR measurement. It would have been obvious to one of ordinary skill in the art, at the time that the invention was made, that the teachings of **Freedman et al.**, **Klein et al.,** and **Vinegar et al.**, are combinable because each reference is concerned with determining petrophysical parameters, and the relationships of those parameters to formation resistivity. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 3** also apply to **claim 9**.

Prior Art of Record

44. The **prior art made of record** and not relied upon is considered pertinent to applicant's disclosure.

A) **Day et al.,** US patent 6,255,819 B1 issued July 3rd 2001, filed October 25th 1999.

B) **Tutunji et al.,** US patent 6,337,568 B1 issued January 2002, filed April 7th 2000, the **Tutunji et al.,** patent is a continuation in part of **Day et al.,** US patent 6,255,819 B1.

Conclusion

45. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

46. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(703) 872-9306**.

Tiffany A. Fetzner

TAF
September 29, 2004

Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800